WHAT IS CLAIMED IS:

1. A method for transmitting and recovering a signal x, said method comprising the steps of:

generating a plurality N of side descriptions $\hat{x}_1, \hat{x}_2, \ldots\ldots, \hat{x}_N$ of said signal x;

transmitting said respective plurality N of side descriptions $\hat{x}_1, \hat{x}_2, \ldots\ldots, \hat{x}_N$ over a respective plurality of channels;

recovering a subset $M(1 \leq M \leq N)$ of said respective plurality N of transmitted side descriptions; and

estimating a central description $\hat{x}_0$ from said respective subset M of said side descriptions $\hat{x}_1, \hat{x}_2, \ldots\ldots, \hat{x}_M$ using data fusion.

2. A method in accordance with claim 1, wherein said step of generating a plurality N of side descriptions $\hat{x}_1, \hat{x}_2, \ldots\ldots, \hat{x}_N$ of said signal comprises:

passing said signal x through a respective different transformation function $F_1, F_2, \ldots, F_N$ to generate a respective side description $\hat{x}_1, \hat{x}_2, \ldots\ldots, \hat{x}_N$.

3. A method in accordance with claim 2, comprising:

quantizing said respective side descriptions $\hat{x}_1, \hat{x}_2, \ldots\ldots, \hat{x}_N$ to a predetermined bit length.

4. A method in accordance with claim 2, wherein said step of recovering a subset $M(1 \leq M \leq N)$ of said respective plurality N of transmitted side descriptions comprises:

passing each said respective subset M of said side descriptions $\hat{x}_1, \hat{x}_2, \ldots\ldots, \hat{x}_M$ through a respective inverse transformation function of said respective transformation function $F_1, F_2, \ldots, F_M$ associated with said respective subset M of said side descriptions $\hat{x}_1, \hat{x}_2, \ldots\ldots, \hat{x}_M$.

5. A method in accordance with claim 1, wherein said data fusion comprises:

estimating said central description $\hat{x}_0$ as a weighted sum $\alpha_1\hat{x}_1 + \alpha_2\hat{x}_2 + \ldots.\alpha_M\hat{x}_M$, wherein $0 \leq \alpha_1 \leq 1,\ 0 \leq \alpha_2 \leq 1, \ldots.. 0 \leq \alpha_1 \leq 1$, of said subset M of side descriptions $\hat{x}_1, \hat{x}_2, \ldots\ldots, \hat{x}_M$.

6. A computer-readable medium such as disk or memory having instructions stored thereon for causing a processor to perform the method of claim 1.

7. A method for recovering a signal, said signal transmitted as plurality of side descriptions of said signal transmitted over a respective plurality of channels, said method comprising the steps of:

recovering a respective plurality of recovered side descriptions from said respective plurality of transmitted side descriptions; and

estimating a central description from said respective plurality of recovered side descriptions using data fusion.

8. A method in accordance with claim 7, wherein each of said plurality of respective comprises a different transformation function of said signal, and wherein said step of recovering a respective plurality of recovered side descriptions from said respective plurality of transmitted side descriptions comprises:

passing each said respective plurality of transmitted side description through a respective inverse transformation function of said respective transformation function.

9. A method in accordance with claim 7, wherein said data fusion comprises:

estimating said central description as a weighted sum of said plurality of side descriptions.

10. A computer-readable medium such as disk or memory having instructions stored thereon for causing a processor to perform the method of claim 7.

11. A method of encoding a signal x into N side descriptions, wherein from two or more of said N side descriptions said signal x can be estimated, said method comprising the steps of:

transforming said signal x with a first transformation function F_1 to generate a first side description $\hat{x}_1$;

for side descriptions $2 to N$, transforming said signal x with respective transformation functions F_2 to F_N to generate respective side descriptions $\hat{x}_2$ to $\hat{x}_N$;

wherein said N transformation functions F_1 to F_N are not all the same.

12. A method in accordance with claim 11, wherein:

said step for transforming said signal x with said first transformation function F_1 to generate said first side description $\hat{x}_1$ comprises encoding said signal x as a first group of discrete values in a transform domain of $F_1 x$, wherein said first group of discrete values are specified by a first codebook of a first quantizer and a first vector comprising one or more elements of said transform domain $F_1 x$ and could be represented by any codeword in said first codebook; and

said step for transforming said signal x with respective transformation functions F_2 to F_N to generate respective side descriptions $\hat{x}_2$ to $\hat{x}_N$ comprises respectively encoding said signal x as a respective second through nth group of discrete values in respective transform domains of $F_2 x$ to $F_N x$, wherein said respective second through nth group of discrete values are specified by a respective second through nth codebook of a respective second through nth quantizer and a respective second through nth vector comprising one or more elements of said respective transform domains of $F_2 x$ to $F_N x$, and could be represented by any codeword in said respective second through nth codebook.

13. A method in accordance with claim 12, wherein:

one transform in said N transformation functions F_1 to F_N is F_i, another transform in said N transformation functions F_1 to F_N comprises shifting said respective

group of discrete values associated with said another transform to generate a shifted signal x_{sh} and then applying F_i to said shifted signal x_{sh}.

14. A method in accordance with claim 12, wherein:

one transform in said N transformation functions F_1 to F_N is F_i, another transform in said N transformation functions F_1 to F_N comprises said respective group of discrete values associated with said another transform to generate a flipped signal x_{fl} and then applying F_i to said flipped signal x_{fl}.

15. A method in accordance with claim 12, wherein:

one transform in said N transformation functions F_1 to F_N is F_i, which comprises grouping said respective group of discrete values associated with said another transform into K data blocks and then applying respective transformation functions $F_{i1}, F_{i2}, \ldots\ldots F_{iK}$ to said K data blocks;

another transform in the N transform is F_j, which comprises grouping said respective group of discrete values associated with said another transform into L data blocks that are different from said K data blocks and then applying respective transformation functions F_{j1}, $F_{j2}, \ldots\ldots F_{jL}$ to said L data blocks.

16. A method in accordance with claim 12, wherein said respective side descriptions $\hat{x}_1$ to $\hat{x}_N$ are generated by the steps:

applying said respective transformations functions F_1 through F_N to said respective first through N^{th} group of discrete values in said respective transform domains of F_1x to F_Nx to generate respective transformed descriptions $X_1 = F_1x$ through $X_N = F_Nx$; and

quantizing said respective transformed descriptions X_1 through X_N as X_{1Q} through X_{NQ}.

17. A method in accordance with claim 16, further comprising the steps:

perturbing said respective first through N^{th} group of discrete values in said respective transform domains of F_1x to F_Nx of respective quantized transformed descriptions X_{1Q} through X_{NQ}, with respective perturbed values that are in said respective first through Nth codebook of said respective first through Nth quantizers;

determining whether or not an objective function is reduced by said perturbation; and

replacing said first through N^{th} group of discrete values in said respective transform domains of F_1x to F_Nx of respective quantized transformed descriptions X_{1Q} through X_{NQ} with said respective perturbed values if said objective function is reduced.

18. A computer-readable medium such as disk or memory having instructions stored thereon for causing a processor to perform the method of claim 12.

19. A method of encoding a signal x into N side descriptions, wherein from two or more of said N side descriptions said signal x can be estimated, said method comprising the steps of:

transforming said signal x with a first transformation function F_1 to generate a first side description $\hat{x}_1$;

for side descriptions $2 to N$, transforming said signal x with respective transformation functions F_2 to F_N to generate respective side descriptions $\hat{x}_2$ to $\hat{x}_N$;

introducing forced error into said respective side descriptions $\hat{x}_2$ to $\hat{x}_N$;

wherein said N transformation functions F_1 to F_N are not all the same.

20. A computer-readable medium such as disk or memory having instructions stored thereon for causing a processor to perform the method of claim 19.

21. A method of encoding a signal represented by a data set x into N ($N \geq 2$) data streams, from each data stream, one side description of the signal can be generated, consisting of steps:

applying N encoding schemes to said data set x and generating N data streams $x_1, x_2, \ldots, x_N$ from which N descriptions of data x, $\hat{x}_1$, $\hat{x}_2$, ..., $\hat{x}_N$ can be reconstructed, wherein at least one data stream is generated by application of a transformation function F to said data set x and then quantization of a result Fx of said application of said transformation function;

perturbing elements of each of said data stream $x_1, x_2, \ldots, x_N$ that is generated by application of said transformation function F to said data set x followed by

quantization, wherein each perturbed value must be in a quantization codebook associated with said quantization;

determining whether or not an objective function is reduced; and

replacing values of said perturbed elements with said respective perturbed value if said objective function is reduced.

22. A method in accordance with claim 21, wherein:

said objective function is a weighted sum of respective distortions $D_1, D_2, .., D_n$, and D_0 of respective N descriptions of data x, $\hat{x}_1$, $\hat{x}_2$, ..., $\hat{x}_N$, wherein respective weights assigned to said respective distortions $D_1, D_2, .., D_n$, and D_0 being dependent on characteristics and applications of respective channels over which said respective descriptions of data x, $\hat{x}_1$, $\hat{x}_2$, ..., $\hat{x}_N$ are transmitted.

23. A computer-readable medium such as disk or memory having instructions stored thereon for causing a processor to perform the method of claim 22.